



Project Summary

Pollution Prevention Alternatives, Naval Station Mayport, Florida

The two reports summarized here present the results of an investigation examining pollution prevention alternatives at Naval Station Mayport, located near Jacksonville Beach, FL. The waste streams considered were: (1) non-aqueous liquid wastes generated by the Public Works Center - Transportation (PWC-T) and (2) hazardous and non-hazardous waste rags generated base-wide.

The first report, "Pollution Prevention Alternatives for Public Works Center (Transportation) Waste Fluids at Naval Station Mayport" describes the different non-aqueous liquids, including solvent for parts cleaning; the pollution prevention alternatives that could be utilized to reduce the generation of non-aqueous liquid wastes and the technical and economic benefits and problems created by implementation of each alternative. The second report, "Investigation of Waste Rag Generation at Naval Station Mayport" recommends five specific pollution prevention alternatives that should be considered for implementation to reduce or prevent the generation of waste rags.

This Project Summary was developed by EPA's National Risk Management Research Laboratory, Cincinnati, OH, to announce key findings of the research project that is fully documented in two separate reports (see Project Report ordering information at back).

Introduction

Since 1988, EPA's Waste Reduction Evaluations at Federal Sites (WREAFS)

Program has identified and promoted pollution prevention opportunities at Federal facilities, including the Department of Defense (DOD) facilities. The Naval Station Mayport project was one of a series of pollution prevention studies conducted under WREAFS. The project was funded by the DOD Strategic Environmental Research and Development Program (SERDP).

The purposes of this project were to: (1) develop a Pollution Prevention Opportunity Assessment (PPOA) for non-aqueous liquid wastes generated by the Public Works Center - Transportation (PWC-T) at Naval Station Mayport; and (2) investigate base-wide rag usage at the Naval Station to reduce the volume and toxicity of waste rags generated. The results of the PPOA for the non-aqueous liquid wastes are presented in the report entitled "Pollution Prevention Alternatives for Public Works Center (Transportation) Waste Fluids at Naval Station Mayport." The results of the waste rag investigation are reported in a separate report, entitled "Investigation of Waste Rag Generation at Naval Station Mayport." The findings are summarized here.

Results and Discussion

The mission of Naval Station Mayport is to provide support services for U.S. Navy ships and helicopters that operate from the Mayport, FL Naval facility. The station's Public Works Division currently services 671 different pieces of equipment to support approximately 12 ships. This is expected to increase significantly in the future due to base consolidations. Support equip-

ment includes automobile and truck fleets, road and light construction equipment, aircraft ground support equipment, and marine support equipment.

Waste Fluids

The non-aqueous liquid wastes that are generated at the PWC-T are primarily the result of scheduled and unscheduled maintenance activities. These wastes include used motor oil, hydraulic fluid, transmission fluid, antifreeze, and waste solvent from the washing of parts.

While amounts vary according to workload, purchase records indicate that 2,838 gal of motor oil, 564 gal of hydraulic fluid, 206 gal of transmission fluid, and 441 gal of antifreeze and approximately 2,640 gal of PD-680 (a petroleum-based, non-chlorinated solvent) were purchased by PWC-T in 1993, indicating the approximate amount of waste liquids generated at the PWC-T. Some small amount may be lost due to spills.

It is recommended that an oil sampling and by-pass filtration pilot study be initiated on two large pieces of equipment, such as a bulldozer and a road grader. The pilot study is recommended to confirm that the number of motor oil changes, and hence motor oil usage, can be reduced significantly through implementation of an oil sampling program and installation of by-pass filtration units on each piece of equipment. The report also recommends that an antifreeze recycling unit be obtained by the PWC-T to evaluate the merits of recycling the spent radi-

tor fluid and reducing waste generation. Finally, the report recommends that an automatic parts washer be obtained for testing by the PWC-T to replace the four parts washing stations used to manually clean parts with the PD-680 solvent.

These alternatives are recommended because of their potential to reduce pollution as well as the economic advantages and cost savings they generate. Table 1 presents each of the pollution prevention alternatives identified for waste fluids.

In the report, the base case and associated assumptions with current operations are compared to each pollution prevention alternative. As an example, the report presents the costs and benefits of each of

Table 1. Summary of pollution prevention alternatives for waste fluids at the naval station Mayport PWC-T

Source of Waste Stream	Alternatives Identified
Motor Oil	Oil Sampling By-pass Filtration Synthetic Oils
Hydraulic Fluid	By-pass Filtration Batch Recycling
Transmission Fluid	By-pass Filtration Batch Recycling
Antifreeze	Recycling
Parts Washing	Automatic Parts Washer

the by-pass filtration systems identified for motor oil for a bulldozer, which represents one of the largest motor oil capacities (48 qt) of any piece of equipment serviced by the PWC-T. Table 2 presents the alternate case assumptions and resultant payback associated with installing by-pass filtration for the bulldozer analysis. The information is listed alphabetically by vendor.

Waste Rags

Approximately 86,440 lb of non-recycled hazardous and non-hazardous waste rags are generated annually as a result of maintenance and repair operations at various shorecommands and on board ships which frequent the Naval Station. Five specific pollution prevention alternatives that should be considered for implementation by the Naval Station to reduce or prevent the generation of waste rags:

1. Better operating practices;
2. Installation of equipment cleaning stations to remove contaminants normally removed with rags;
3. Replacement of SERV MART (base supply store) rags with disposable wipers;
4. Use of recyclable rags for oil and grease removal; and
5. Confirmation that used rags are fully contaminated prior to disposal.

Alternatives 1 and 5 require no additional capital investment, but generate a reduction in waste. Alternatives 3 and 4

Table 2. Motor Oil By-Pass Filtration Cost/Benefit Analysis: Bulldozer Alternate Case Assumptions

Vendor	Annual Costs				Total Costs Costs less revenue)		Payback (yr)
	Filtration Unit Cost ^a	Other Costs ^b	Sampling + New Filters ^c	Revenue ^d (from used oil)	First Year ^e	Subsequent Annual Costs	
Enviro Filtration	\$226	\$118.62	\$116	\$2.64	\$457.98	\$231.98	1.0
Fil-max	463	118.62	69	2.64	647.98	184.98	1.7
Gulf Coast	675	118.62	22	2.64	812.98	137.98	2.1
TF Purifiner	845	118.62	56	2.64	1,016.98	171.98	2.9

a Cost of by-pass filtration unit (including a by-pass filter) plus installation.

b Includes costs for new oil (capacity of 48 qt, one oil change/yr, and new oil cost of \$0.69/qt); filter disposal (2 by-pass and one full flow filter/yr at a cost of \$0.50/filter); full flow filter (one new full flow filter/yr at a cost of \$20/filter); downtime (for oil change, one oil change/yr, and a downtime cost of \$50/hr); and Labor (1 hr of labor to change the oil, one oil change/yr, and a labor cost of \$14/hr)

c Includes vendor-specific costs for replacement filters and \$14/yr for sampling oil based on 2 samples/yr at \$7/sample.

d Based on 48 qt of used oil/yr sold at \$0.055/qt.

e Includes filtration unit cost.

were estimated to generate a net cost savings in addition to reducing waste. Use of disposable wipers is somewhat more attractive from a cost perspective than recycling of non-hazardous waste rags, and because of increased absorbency, the ratio of contaminate per unit volume is increased, thus reducing overall generation of rag waste. Alternative 2 is recommended only for high-volume rag use areas. Note that each alternative is a proven technology that has already been implemented by at least one command at the Naval Station.

The five alternatives identified are recommended for implementation because of their potential to reduce pollution as well as the cost savings that they generate. Table 3 presents the pollution prevention

alternatives identified and the type of rag that is best suited for implementation.

Table 4 presents a summary of the base case and alternatives in terms of (1) the amount (lbs) of waste rags generated, (2) the capital costs, if any, associated with implementing the alternatives, and (3) the annual costs associated with the base case and each alternative.

Conclusions

Several potential areas for pollution prevention and waste reduction exist at Naval Station Mayport. In the case of waste fluids (motor oil, hydraulic fluid, transmission fluid, antifreeze, and parts washing liquids), several alternatives are offered, but further investigation by on-site personnel is needed to determine which al-

ternative is most appropriate for the Naval Station. Rag generation could be curtailed by several methods including: improved operating practices; installation of equipment cleaning stations to remove contaminants normally removed with rags; replacement of SERV MART rags with disposable wipers; use of recyclable rags for oil and grease removal; and confirmation that used rags are fully contaminated prior to disposal.

The full reports were submitted in fulfillment of Contract No. 68-D2-00062, Work Assignment No. 1-32 by Southern Research Institute and Pacific Environmental Services, Inc. under the sponsorship of the U.S. Environmental Protection Agency.

Table 3. Summary of Pollution Prevention Alternatives for Waste Rag Generation.

Alternative Identified	Recommended Rag Type	Notes
Implement better operating practices	Both hazardous and non-hazardous	
Use disposable wipers*	Hazardous	Could also be use for non-hazardous
Use recyclable rags	Non-hazardous only	
Dispose of only fully contaminated rags	Non-hazardous only	Not recommended for hazardous rags
Install equipment cleaning stations	Non-hazardous only	Limit to high volume rag use areas

Table 4. Summary of Base Case and Alternatives on Waste Rag Generation, Capital Costs, and Annual Costs

Type of Rag	Scenario	Amount of Waste Generated (lb/yr)	Capital Costs	Total Annual Costs
Hazardous	Base Case	42,750	NA	\$116,844
	Wash Station	NA	NA	NA
	Disposable Wipers Recyclable Rags	4,840 to 7,753 NA	NA NA	20,701 to 34,079 NA
Non-Hazardous	Base Case	43,690	NA	119,414
	Wash Station	38,614	21,000	111,259
	Disposable Wipers Recyclable Rags	4,946 to 7,944 79	NA NA	21,156 to 34,828 48,596
Total (Hazardous plus non-hazardous)	Base Case	86,440	NA	236,258
	Wash Station	81,364	21,000	228,103
	Disposable Wipers Recyclable Rags	9,786 to 15,697 42,829	NA NA	41,857 to 68,907 165,440

Southern Research Institute, Birmingham, AL 35205-5305, and Pacific Environmental Services, Inc., Research Triangle Park, NC 27709-2077 authored the reports.

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The complete reports, entitled: "Pollution Prevention Alternatives for Public Works Center (Transportation) Waste Fluids at Naval Station Mayport, FL," (Order No. PB95-260386; Cost: \$19.50, subject to change); and "Investigation of Waste Rag Generation at Naval Station Mayport," (Order No. PB95-260394; Cost: \$17.50, subject to change); will be available only from:

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